



OIPE

ENTERED

RAW SEQUENCE LISTING
PATENT APPLICATION: US/10/029,677DATE: 05/16/2002
TIME: 13:22:07Input Set : A:\PTO.VSK.txt
Output Set : N:\CRF3\05162002\J029677.raw

3 <110> APPLICANT: Westphal, Ryan S.
4 Feder, John N.
5 Ramanathan, Chandra S.
6 Mintier, Gabriel A.
8 <120> TITLE OF INVENTION: NUCLEIC ACID MOLECULES AND POLYPEPTIDES FOR A HUMAN CATION

CHANNEL
9 POLYPEPTIDE
11 <130> FILE REFERENCE: D0187NP
W--> 12 <140> CURRENT APPLICATION NUMBER: 10/029,677
C--> 13 <141> CURRENT FILING DATE: 2002-05-06
15 <150> PRIOR APPLICATION NUMBER: US 60/257,865
16 <151> PRIOR FILING DATE: 2000-12-21
18 <160> NUMBER OF SEQ ID NOS: 24
20 <170> SOFTWARE: PatentIn version 3.0
22 <210> SEQ ID NO: 1
23 <211> LENGTH: 2186
24 <212> TYPE: DNA
25 <213> ORGANISM: Homo sapiens
27 <220> FEATURE:
28 <221> NAME/KEY: CDS
29 <222> LOCATION: (20)..(2011)
31 <220> FEATURE:
32 <221> NAME/KEY: misc_feature
33 <222> LOCATION: (2150)..(2150)
34 <223> OTHER INFORMATION: wherein "n" equals A, C, G, or T.
37 <400> SEQUENCE: 1
38 ctctagatgt acatggagg atg acc gaa aaa acc aat ggt gtg aag agc tcc 52
39 Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser
40 1 5 10
42 cca gcc aat aat cac aac cat cat gca cct cct gcc atc aag gcc aat 100
43 Pro Ala Asn Asn His Asn His His Ala Pro Pro Ala Ile Lys Ala Asn
44 15 20 25
46 ggc aaa gat gac cac agg aca agc agc agg cca cac tct gca gct gac 148
47 Gly Lys Asp Asp His Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp
48 30 35 40
50 gat gac acc tcc tca gaa ctg cag agg ctg gca gac gtg gat gcc cca 196
51 Asp Asp Thr Ser Ser Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro
52 45 50 55
54 cag cag gga agg agt ggc ttc cgc agg ata gtt cgc ctg gtg ggg atc 244
55 Gln Gln Gly Arg Ser Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile
56 60 65 70 75
58 atc aga gaa tgg gcc aac aag aat ttc cga gag gag gaa cct agg cct 292
59 Ile Arg Glu Trp Ala Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro
60 80 85 90

RAW SEQUENCE LISTING
 PATENT APPLICATION: US/10/029,677

DATE: 05/16/2002
 TIME: 13:22:07

Input Set : A:\PTO.VSK.txt
 Output Set: N:\CRF3\05162002\J029677.raw

| | | |
|-----|---|------|
| 62 | gac tca ttc ctc gag cgt ttt cgt ggg cct gaa ctc cag act gtg acc | 340 |
| 63 | Asp Ser Phe Leu Glu Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr | |
| 64 | 95 100 105 | |
| 66 | aca cag gag ggg gat ggc aaa ggc gac aag gat ggc gag gac aaa ggc | 388 |
| 67 | Thr Gln Glu Gly Asp Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly | |
| 68 | 110 115 120 | |
| 70 | acc aag aag aaa ttt gaa cta ttt gtc ttg gac cca gct ggg gat ttg | 436 |
| 71 | Thr Lys Lys Lys Phe Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu | |
| 72 | 125 130 135 | |
| 74 | tac tac tgc tgg cta ttt gtc att gcc atg ccc gtc ctt tac aac tgg | 484 |
| 75 | Tyr Tyr Cys Trp Leu Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp | |
| 76 | 140 145 150 155 | |
| 78 | tgc ctg ctg gtg gcc aga gcc tgc ttc agt gac cta cag aaa ggc tac | 532 |
| 79 | Cys Leu Leu Val Ala Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr | |
| 80 | 160 165 170 | |
| 82 | tac ctg gtg tgg ctg gtg ctg gat tat gtc tca gat gtg gtc tac att | 580 |
| 83 | Tyr Leu Val Trp Leu Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile | |
| 84 | 175 180 185 | |
| 86 | gcg gac ctc ttc atc cga ttg cgc aca ggt ttc ctg gag cag ggg ctg | 628 |
| 87 | Ala Asp Leu Phe Ile Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu | |
| 88 | 190 195 200 | |
| 90 | ctg gtc aaa gat acc aag aaa ctg cga gac aac tac atc cac acc ctg | 676 |
| 91 | Leu Val Lys Asp Thr Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu | |
| 92 | 205 210 215 | |
| 94 | cag ttc aag ctg gat gtg gct tcc atc atc ccc act gac ctg atc tat | 724 |
| 95 | Gln Phe Lys Leu Asp Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr | |
| 96 | 220 225 230 235 | |
| 98 | ttt gct gtg gac atc cac agc cct gag gtg cgc ttc aac cgc ctg ctg | 772 |
| 99 | Phe Ala Val Asp Ile His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu | |
| 100 | 240 245 250 | |
| 102 | cac ttt gcc cgc atg ttt gag ttc ttt gac cgg aca gag aca cgc acc | 820 |
| 103 | His Phe Ala Arg Met Phe Glu Phe Phe Asp Arg Thr Glu Thr Arg Thr | |
| 104 | 255 260 265 | |
| 106 | aac tac cct aac atc ttc cgc atc agc aac ctt gtc ctc tac atc ttg | 868 |
| 107 | Asn Tyr Pro Asn Ile Phe Arg Ile Ser Asn Leu Val Leu Tyr Ile Leu | |
| 108 | 270 275 280 | |
| 110 | gtc atc atc cac tgg aat gcc tgc atc tat tat gcc atc tcc aaa tcc | 916 |
| 111 | Val Ile Ile His Trp Asn Ala Cys Ile Tyr Tyr Ala Ile Ser Lys Ser | |
| 112 | 285 290 295 | |
| 114 | ata ggc ttt ggg gtc gac acc tgg gtt tac cca aac atc act gac cct | 964 |
| 115 | Ile Gly Phe Gly Val Asp Thr Trp Val Tyr Pro Asn Ile Thr Asp Pro | |
| 116 | 300 305 310 315 | |
| 118 | gag tat ggc tac ctg gct agg gaa tac atc tat tgc ctt tac tgg tcc | 1012 |
| 119 | Glu Tyr Gly Tyr Leu Ala Arg Glu Tyr Ile Tyr Cys Leu Tyr Trp Ser | |
| 120 | 320 325 330 | |
| 122 | aca ctg act ctc act acc att ggg gag aca cca ccc cct gta aag gat | 1060 |
| 123 | Thr Leu Thr Leu Thr Thr Ile Gly Glu Thr Pro Pro Pro Val Lys Asp | |
| 124 | 335 340 345 | |
| 126 | gag gag tac cta ttt gtc atc ttt gac ttc ctg att ggc gtc ctc atc | 1108 |

RAW SEQUENCE LISTING
PATENT APPLICATION: US/10/029,677

DATE: 05/16/2002
TIME: 13:22:07

Input Set : A:\PTO.VSK.txt
Output Set: N:\CRF3\05162002\J029677.raw

```

127 Glu Glu Tyr Leu Phe Val Ile Phe Asp Phe Leu Ile Gly Val Leu Ile
128          350          355          360
130 ttt gcc acc atc gtg gga aat gtg ggc tcc atg atc tcc aac atg aat      1156
131 Phe Ala Thr Ile Val Gly Asn Val Gly Ser Met Ile Ser Asn Met Asn
132          365          370          375
134 gcc acc cgg gca gag ttc cag gct aag atc gat gcc gtg aaa cac tac      1204
135 Ala Thr Arg Ala Glu Phe Gln Ala Lys Ile Asp Ala Val Lys His Tyr
136 380          385          390          395
138 atg cag ttc cga aag gtc agc aag ggg atg gaa gcc aag gtc att agg      1252
139 Met Gln Phe Arg Lys Val Ser Lys Gly Met Glu Ala Lys Val Ile Arg
140          400          405          410
142 tgg ttt gac tac ttg tgg acc aat aag aag aca gtg gat gag cga gaa      1300
143 Trp Phe Asp Tyr Leu Trp Thr Asn Lys Lys Thr Val Asp Glu Arg Glu
144          415          420          425
146 att ctc aag aat ctg cca gcc aag ctc agg gct gag ata gcc acc aat      1348
147 Ile Leu Lys Asn Leu Pro Ala Lys Leu Arg Ala Glu Ile Ala Thr Asn
148          430          435          440
150 gtc cac ttg tcc aca ctc aag aaa gtg cgc atc ttc cat gat tgt gag      1396
151 Val His Leu Ser Thr Leu Lys Lys Val Arg Ile Phe His Asp Cys Glu
152          445          450          455
154 gct ggc ctg ctg gta gag ctg gta ctg aaa ctc cgt cct cag gtc ttc      1444
155 Ala Gly Leu Leu Val Glu Leu Val Leu Lys Leu Arg Pro Gln Val Phe
156 460          465          470          475
158 agt cct ggg gat tac att tgc cgc aaa ggg gac atc gcc aag gag atg      1492
159 Ser Pro Gly Asp Tyr Ile Cys Arg Lys Gly Asp Ile Gly Lys Glu Met
160          480          485          490
162 tac atc att aag gag ggc aaa ctg gca gtg gtg gct gat gat ggt gtg      1540
163 Tyr Ile Ile Lys Glu Gly Lys Leu Ala Val Val Ala Asp Asp Gly Val
164          495          500          505
166 act cag tat gct ctg ctg tcg gct gga agc tgc ttt ggc gag atc agt      1588
167 Thr Gln Tyr Ala Leu Leu Ser Ala Gly Ser Cys Phe Gly Glu Ile Ser
168          510          515          520
170 atc ctt aac att aag ggc agt aaa atg ggc aat cga cgc aca gct aat      1636
171 Ile Leu Asn Ile Lys Gly Ser Lys Met Gly Asn Arg Arg Thr Ala Asn
172          525          530          535
174 atc cgc agc ctg ggc tac tca gat ctc ttc tgc ttg tcc aag gat gat      1684
175 Ile Arg Ser Leu Gly Tyr Ser Asp Leu Phe Cys Leu Ser Lys Asp Asp
176 540          545          550          555
178 ctt atg gaa gct gtg act gag tac cct gat gcc aag aaa gtc cta gaa      1732
179 Leu Met Glu Ala Val Thr Glu Tyr Pro Asp Ala Lys Lys Val Leu Glu
180          560          565          570
182 gag agg ggt cgg gag atc ctc atg aag gag gga ctg ctg gat gag aac      1780
183 Glu Arg Gly Arg Glu Ile Leu Met Lys Glu Gly Leu Leu Asp Glu Asn
184          575          580          585
186 gaa gtg gca acc agc atg gag gtc gac gtg cag gag aag cta ggg cag      1828
187 Glu Val Ala Thr Ser Met Glu Val Asp Val Gln Glu Lys Leu Gly Gln
188          590          595          600
190 ctg gag acc aac atg gaa acc ttg tac act cgc ttt ggc cgc ctg ctg      1876
191 Leu Glu Thr Asn Met Glu Thr Leu Tyr Thr Arg Phe Gly Arg Leu Leu

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/10/029,677

DATE: 05/16/2002

TIME: 13:22:07

Input Set : A:\PTO.VSK.txt

Output Set: N:\CRF3\05162002\J029677.raw

```

192      605      610      615
194 gct gag tac acg ggg gcc cag cag aag ctc aag cag cgc atc aca gtt      1924
195 Ala Glu Tyr Thr Gly Ala Gln Gln Lys Leu Lys Gln Arg Ile Thr Val
196 620      625      630
198 ctg gaa acc aag atg aaa cag aac aat gaa gat gac tac ctg tct gat      1972
199 Leu Glu Thr Lys Met Lys Gln Asn Asn Glu Asp Asp Tyr Leu Ser Asp
200      640      645      650
202 ggg atg aac agc cct gag ctg gct gct gct gac gag cca taagacctgg      2021
203 Gly Met Asn Ser Pro Glu Leu Ala Ala Asp Glu Pro
204      655      660
206 ggcccaactg cctctccagc attggccttg gccttgatcc cagaagctag aggagctatt      2081
208 tagatctccg gatttacatg cattaccctc atgttcctg aattctccca aaagtctctc      2141
W--> 210 tgacctgng tttttggcct aaacatccaa gattccgcct cggat      2186
213 <210> SEQ ID NO: 2
214 <211> LENGTH: 664
215 <212> TYPE: PRT
216 <213> ORGANISM: Homo sapiens
219 <400> SEQUENCE: 2
221 Met Thr Glu Lys Thr Asn Gly Val Lys Ser Ser Pro Ala Asn Asn His
222 1      5      10      15
225 Asn His His Ala Pro Pro Ala Ile Lys Ala Asn Gly Lys Asp Asp His
226      20      25      30
229 Arg Thr Ser Ser Arg Pro His Ser Ala Ala Asp Asp Asp Thr Ser Ser
230      35      40      45
233 Glu Leu Gln Arg Leu Ala Asp Val Asp Ala Pro Gln Gln Gly Arg Ser
234      50      55      60
237 Gly Phe Arg Arg Ile Val Arg Leu Val Gly Ile Ile Arg Glu Trp Ala
238 65      70      75      80
241 Asn Lys Asn Phe Arg Glu Glu Glu Pro Arg Pro Asp Ser Phe Leu Glu
242      85      90      95
245 Arg Phe Arg Gly Pro Glu Leu Gln Thr Val Thr Thr Gln Glu Gly Asp
246      100      105      110
249 Gly Lys Gly Asp Lys Asp Gly Glu Asp Lys Gly Thr Lys Lys Lys Phe
250      115      120      125
253 Glu Leu Phe Val Leu Asp Pro Ala Gly Asp Leu Tyr Tyr Cys Trp Leu
254      130      135      140
257 Phe Val Ile Ala Met Pro Val Leu Tyr Asn Trp Cys Leu Leu Val Ala
258 145      150      155      160
261 Arg Ala Cys Phe Ser Asp Leu Gln Lys Gly Tyr Tyr Leu Val Trp Leu
262      165      170      175
265 Val Leu Asp Tyr Val Ser Asp Val Val Tyr Ile Ala Asp Leu Phe Ile
266      180      185      190
269 Arg Leu Arg Thr Gly Phe Leu Glu Gln Gly Leu Leu Val Lys Asp Thr
270      195      200      205
273 Lys Lys Leu Arg Asp Asn Tyr Ile His Thr Leu Gln Phe Lys Leu Asp
274      210      215      220
277 Val Ala Ser Ile Ile Pro Thr Asp Leu Ile Tyr Phe Ala Val Asp Ile
278 225      230      235      240
281 His Ser Pro Glu Val Arg Phe Asn Arg Leu Leu His Phe Ala Arg Met

```

RAW SEQUENCE LISTING
 PATENT APPLICATION: US/10/029,677

DATE: 05/16/2002
 TIME: 13:22:07

Input Set : A:\PTO.VSK.txt
 Output Set: N:\CRF3\05162002\J029677.raw

| | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|
| 282 | | 245 | | 250 | | 255 |
| 285 | Phe | Glu | Phe | Phe | Asp | Arg |
| 286 | | | 260 | | 265 | 270 |
| 289 | Phe | Arg | Ile | Ser | Asn | Leu |
| 290 | | 275 | | | 280 | |
| 293 | Asn | Ala | Cys | Ile | Tyr | Tyr |
| 294 | | 290 | | | 295 | |
| 297 | Asp | Thr | Trp | Val | Tyr | Pro |
| 298 | 305 | | | 310 | | 315 |
| 301 | Ala | Arg | Glu | Tyr | Ile | Tyr |
| 302 | | | 325 | | 330 | |
| 305 | Thr | Ile | Gly | Glu | Thr | Pro |
| 306 | | | 340 | | 345 | |
| 309 | Val | Ile | Phe | Asp | Phe | Leu |
| 310 | | 355 | | | 360 | |
| 313 | Gly | Asn | Val | Gly | Ser | Met |
| 314 | | 370 | | | 375 | |
| 317 | Phe | Gln | Ala | Lys | Ile | Asp |
| 318 | 385 | | | | 390 | |
| 321 | Val | Ser | Lys | Gly | Met | Glu |
| 322 | | | 405 | | | 410 |
| 325 | Trp | Thr | Asn | Lys | Lys | Thr |
| 326 | | | 420 | | | 425 |
| 329 | Pro | Ala | Lys | Leu | Arg | Ala |
| 330 | | 435 | | | 440 | |
| 333 | Leu | Lys | Lys | Val | Arg | Ile |
| 334 | | 450 | | | 455 | |
| 337 | Glu | Leu | Val | Leu | Lys | Leu |
| 338 | 465 | | | | 470 | |
| 341 | Ile | Cys | Arg | Lys | Gly | Asp |
| 342 | | | 485 | | | 490 |
| 345 | Gly | Lys | Leu | Ala | Val | Val |
| 346 | | | 500 | | | 505 |
| 349 | Leu | Ser | Ala | Gly | Ser | Cys |
| 350 | | 515 | | | 520 | |
| 353 | Gly | Ser | Lys | Met | Gly | Asn |
| 354 | | 530 | | | 535 | |
| 357 | Tyr | Ser | Asp | Leu | Phe | Cys |
| 358 | 545 | | | | 550 | |
| 361 | Thr | Glu | Tyr | Pro | Asp | Ala |
| 362 | | | 565 | | | 570 |
| 365 | Ile | Leu | Met | Lys | Glu | Gly |
| 366 | | | 580 | | | 585 |
| 369 | Met | Glu | Val | Asp | Val | Gln |
| 370 | | 595 | | | 600 | |
| 373 | Glu | Thr | Leu | Tyr | Thr | Arg |
| 374 | | 610 | | | 615 | |
| 377 | Ala | Gln | Gln | Lys | Leu | Lys |
| 378 | 625 | | | | 630 | |

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/10/029,677

DATE: 05/16/2002
TIME: 13:22:08

Input Set : A:\PTO.VSK.txt
Output Set: N:\CRF3\05162002\J029677.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:1; N Pos. 2150

VERIFICATION SUMMARY

PATENT APPLICATION: US/10/029,677

DATE: 05/16/2002

TIME: 13:22:08

Input Set : A:\PTO.VSK.txt

Output Set: N:\CRF3\05162002\J029677.raw

L:12 M:283 W: Missing Blank Line separator, <140> field identifier
L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:210 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:2141